FRD Activities Report
March 2003

Research Programs

JOINT URBAN 2003 (JUT)

Much of the FRD staff emphasis this past month was directed at preparing for JUT. Field deployment is a scant two months away. Of the $4 million project, FRD garnered approximately $1 million, or more that 25% of the total budget. With that large infusion of cash, many are working to fulfill our commitments to the project.

This month we received the first draft of the field experiment plan and made appropriate comments. The plan calls for the use of all 100 of our programmable integrated gas samplers (PIGS), which are portable bag samplers. The plan also calls for us to build 50 more PIGS with adjustable programming capabilities. These samplers have been dubbed Super PIGS. They will provide us much greater flexibility in developing deployment strategies. (Kirk.Clawson@noaa.gov and staff)

Two additional prototype versions of the new sampler and cartridge have been manufactured by Valley Sheet Metal. The current version appears to have overcome the small problems of the previous versions and will be the one that we manufacture. Valley Sheet Metal will be manufacturing the samplers and cartridge parts over the next few weeks. Electronic and mechanical parts and assemblies used in the samplers and cartridges are being fabricated in our shop at this time. (Randy.Johnson@noaa.gov, Shane Beard)

Software development for the new programmable integrating gas sampler (PIGS) is nearing completion. Requests from the JUT 2003 planning group have required that the samplers have considerably more capability than originally planned for this experiment. This has required development of a new downloader and software instead of using the existing ones as originally planned. (Roger.Carter@noaa.gov)

Testing was conducted on the automated tracer gas analysis system (ATGAS) to determine what effect Tygon® tubing has on carry-over from high concentration samples. The latex rubber tubing that attaches to each bag in the cartridge was replaced with Tygon® tubing. The 208,500 ppt standard was analyzed followed by the 1.97 ppt standard. The Tygon® tubing produced slightly less carry-over than the latex tubing. Therefore, the latex tubing will be replaced with Tygon® tubing. As further studies are conducted, the effect of using Tygon over time will be assessed. (Debbie.Lacroix@noaa.gov)

Testing was also done on the ATGAS to determine the appropriate sample loop size to provide the largest analytical range in the concentration areas of interest. The 2 ml sample loops provided a calibration range from 2 ppt to 20,000 ppt where the detector became saturated. Sample loops

of 1 ml, 500 µl and 250 µl have been ordered and will be tested next month. (Debbie.Lacroix@noaa.gov)

We received the re-certification of the three sulfur hexafluoride calibration gases that were sent to Scott-Marrin last month. The 3.47 ppt standard last analyzed in 1996 was certified to be 3.84 ± 10%, the 292.9 ppt standard last analyzed in 1992 was certified to be 302 ± 5% and the 18,600 ppt standard last analyzed in 1988 was certified to be 19,750 ± 5%. The previous certified values were within the re-certification tolerances, except for the 18.6 ppt standard which was slightly high. For the most part, this indicates a rather stable series of SF_6 standards we maintain in our possession. We will consider sending back other calibration gases as appropriate based on this information. (Debbie.Lacroix@noaa.gov, Roger Carter)

We have provided ITT, a JUT co-participant, with information about NRC and State of Oklahoma nuclear radiation regulations. ITT is purchasing five TGA-4000 SF_6 continuous analyzers to bring to the JUT 2003 experiment. They are planning to place them on the streets in portable enclosures where they may be accessible to the public. We hope that the information we sent to them will help them resolve nuclear radiation licensing issues so there will not be a problem during the experiment. (Roger.Carter@noaa.gov, Debbie Lacroix)

A new cartridge cleaning system is being built to allow simultaneous cleaning of new and old cartridges at greater than twice the rate the present cleaning system allows. (Randy.Johnson@noaa.gov, Tom Strong)

URBAN-2000

Joe Chang of George Mason University contacted us with a number of questions about data quality for the integrated samplers (PIGS) in the URBAN-2000 Salt Lake City, Utah experiment. Apparently they are using the data to develop urban dispersion coefficients. We answered his questions and provided a draft copy of the report that discussed the quality control of that data. (Roger.Carter@noaa.gov, Debbie Lacroix)

CBLAST-High

Upgrades have been made to the data system hardware package. The repackaging of the hardware allows for easier access to the computer when mounted in racks on the NOAA P-3. Work has begun on the fabrication of a second aluminum hemisphere for the P-3 BAT probe. Some flaws were identified in the original design and these have been corrected. With the new sphere, we will enter the 2003 hurricane season with a backup to ensure that we will continue flying if one of the spheres becomes damaged. (Jeff.French@noaa.gov, Shane Beard, Randy Johnson)

ET Probe

A considerable amount of time was spent in March going through the software being used for data acquisition on the ET probes. The AD boards used with the probes are only supported under

Windows, so the ET probe software is by necessity a Windows program. This makes the source code significantly more difficult to follow, because the program must contain a somewhat convoluted looping structure to handle messages generated by the operating system and hardware drivers. A major effort is under way to simplify the source code and improve its reliability. Hopefully, this effort will be completed in April, so further field testing can be started in May. The project is still suffering from delays in getting the FY 2003 funding from ONR. With over half the fiscal year now passed, we may be forced to push some of the FY 2003 development goals ahead into 2004. One goal that may be pushed ahead is an effort to develop a backflushing mechanism to clear water from the pressure ports. (Richard.Eckman@noaa.gov)

SERA Instrument Development

Four fiberglass BAT spheres were manufactured to support the ATDD program for supplying instrumentation for the Italian Sky Arrows. The BAT probes on the new Sky Arrows will be equipped with the Fast, Ultra-Sensitive Temperature (FUST) probe. Additionally, FRD will continue working with Airborne Research Australia (ARA) in collaborative research on instrument development. We will be supplying ARA with two of the new aluminum BAT spheres to be tested on ARA aircraft. (Jeff.French@noaa.gov, Shane Beard)

Cooperative Research with INEEL

Emergency Operations Center (EOC)

On March 5th, we attended a pre-staged drill and used the new INEELViz enhancements. The following were problems that were found:

1) Because of WEBEOC changes, NOAA currently does not have a computer for "what if" scenarios. The answer to this problem was provided by EOC support personnel. The computer on the left in the NOAA area can be used for “what if” scenarios. This computer displays in the Command Room of the EOC. Initially it will be used to show actual weather at the site in the Command Room. When "what if" stuff is about to be commenced, the EOC Support Director will be informed so the overhead in the Command Room can be changed to another channel. This way Command Room personnel won't be confused about what they are seeing.

2) An annotation capability was added to INEELViz to give EOC personnel more explicit model information. Unfortunately, the annotation would not print unless the information on the screen was cut and pasted to another utility.

All in all, the players seemed very pleased with the new changes. (Debbie.Lacroix@noaa.gov, Richard Eckman).

INEEL Support

Staff from the DOE National Atmospheric Release Advisory Center (NARAC) visited INEEL in March to install the iClient dispersion modeling software. FRD staff attended one of the iClient orientation meetings to obtain a better understanding of the ARAC system's capabilities. Currently the system has no linkage to the INEEL Mesonet data, so any model runs at INEEL are driven by meteorological data from distant airports, such as the Idaho Falls and Challis airports. Challis, incidentally, is approximately 100 miles from the INEEL and is located in rugged mountainous terrain, whereas the INEEL is in the relatively flat Snake River Plain. These measurements are too distant from INEEL to provide representative conditions, so FRD has cautioned against putting much credence in the ARAC output until the model can ingest Mesonet data. The time to obtain model output from ARAC also seems to be excessive, and is on the order of 15 minutes. INEEL management has recently stated that they intend to keep ARAC only as a backup modeling capability to the FRD effort. (Richard.Eckman@noaa.gov, Kirk Clawson)

INEEL Mesoscale Modeling

The MM5 modeling for INEEL has been running smoothly over the last few months. Disruptions due to Internet connectivity, hardware failures, and NCEP server problems have been infrequent. The "official" model runs that are accessed from FRD's web home page are still being run on the older Alpha-processor workstation. These MM5 runs are initialized from Eta model output at 40 km horizontal grid spacing. A newer configuration based on 12 km Eta model output is still being tested on a Linux workstation. Output from this configuration is available internally within FRD, but is not being posted for public display. The new configuration appears to provide improved forecasts for INEEL, but it has not yet become the "official" configuration because it does not run as reliably. Problems are usually caused by a lack of availability of the higher resolution Eta model output. (Richard.Eckman@noaa.gov)

Other Activities

Air Quality Forecasting Research Plan

The NOAA Long-Term Research Plan for Air Quality Forecasting was completed and submitted to David Rogers and the Research Council on March 3. The plan was a cooperative effort of the Aeronomy Laboratory, Air Resources Laboratory, Environmental Technologies Laboratory, Forecast Systems Laboratory, and National Severe Storms Laboratory with input from the National Weather Service. The plan will be used to support ongoing efforts to secure base funds to support the development of an operational air quality forecasting capability in NOAA. (tom.watson@noaa.gov)

NAERS

Plans are currently under way for the second workshop of the Network of Airborne Environmental Research Scientists (NAERS) to be held in Trento, Italy, October 2003. The

planning committee for this meeting consists of Jorg Hacker (ARA, Australia), Jeff French (NOAA/ARL), Bruno Neininger (MetAir, Switzerland), and Franco Miglietta (CNR, Italy). The workshop will build on many of the discussions that were begun at the inaugural workshop, hosted by ARLFRD in Idaho Falls in 2002. This Network of scientists, consisting of researchers from more than 20 institutions world-wide, is critical to the success of the SERA program within ARL. (Jeff.French@noaa.gov)

Programs

Several employees attended the March Women's History Month Program, "Women Pioneering the Future" sponsored by the INEEL at University Place Auditorium. This was a free two-hour presentation showcasing and celebrating women's achievements and diverse backgrounds. (Debbie.Lacroix@noaa.gov, Paula Fee, Joyce Silvester, Tami Grimmett).

Security

A new security alarm system was installed and tested in March that will permit easier access to the building by FRD employees. Access now will be accomplished by a key card instead of a telephone call to INEEL security.

Papers

Grimmet, T. K. 2003. Combining Conditioned Laser Altimeter Data and GPS Altitude Data To Obtain Accurate Aircraft Sensor Height Measurements. NOAA Technical Memorandum OAR ARL-248, Air Resources Laboratory, Silver Spring, Maryland.

Visitors

Ron Baskett and Jodi Greenfield from NARAC visited FRD and installed an ARAC iClient for informational purposes on 12 April.

Outreach

Due to the hard work and generosity of Joyce Silvester, Brad Reese, Roger Carter and Shane Beard, we were able to donate five of our outdated computer systems to the local YMCA organization for educational use in their preschool and afterschool programs. These programs are offered to the children in the community regardless of a family's ability to pay. Many of the children are from low income homes who do not have access to computers and valuable learning programs. This is a continuation of our support to our community and especially its children in regards to education and educational activities. (Debbie.Lacroix@noaa.gov)